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安徽贵池晚古新世哺乳类

黄 学 诗
（中国科学院古脊椎动物与古人类研究所 北京 100044）
陈 烈 祖
（安徽省地质矿产局第二水文工程地质队 安徽 芜湖 241001）

摘要 记述了在安徽省贵池县梅埂地区红层中发现的3种哺乳动物化石，其中包括钝脚目全棱齿兽科1新属新种——翟氏贵池脊齿兽(*Guichilambda zhaii* gen. et sp. nov.)。新属与古脊齿兽属较为相似，但在个体大、上颊齿横宽、上臼齿中附尖弱、下颌骨具前外凸缘、下臼齿三角座和跟座V形夹角小等方面又明显不同于该属任何已知种。文中还根据所发现化石的进化水平和组合性质，并与国内外有关层位对比，定地层时代为晚古新世。

关键词 安徽贵池，晚古新世，南方有蹄目，钝脚目
中图法分类号 Q915.873

安徽省贵池县梅埂地区，属铜陵盆地西段，位于长江南岸江边。这里出露的红色岩系，以往统称为上白垩统。直到本世纪80年代，安徽省地质矿产局区域地质调查队对该地区进行详细考察，才首次发现丰富的叶肢介、介形类和哺乳动物化石，并测制地层剖面，做了详细的分层工作。他们引用了邻近地区潜山盆地和宣城盆地地层名称，将产叶肢介的地层称为痘姆组，而将上部含哺乳动物化石的地层叫做双塔寺组。本文即是这次发现的哺乳动物化石的研究报告，它包括了钝脚目全棱齿兽科的1个新属新种、古脊齿兽属的1个相似种和南方有蹄目北柱兽科的1个种。

一、标 本 记 述

钝脚目 Pantodonta Cope, 1873

全棱齿兽科 Pantolambdodontidae Granger et Gregory, 1934

贵池脊齿兽(新属) *Guichilambda* gen. et sp. nov.

属型种 翟氏贵池脊齿兽(*Guichilambda zhaii* sp. nov.)。

特征 个体大小介于古脊齿兽(*Archaeolambda*)和全棱齿兽(*Pantolambdodon*)之间。上颊齿横宽。上臼齿原尖前、后脊分别与前、后尖相接，形成封闭的三角凹。M1和M2中附尖弱，后尖外侧具小纵肋。M2前、后壁长度近等。M3无后脊和后附尖。下颌骨具前外凸缘。下前臼齿跟座斜脊靠内、小，P4跟座成脊状。下臼齿的三角座与跟座高差

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大，V形夹角小于60°。

属名由来 化石产地所在县——安徽省贵池县。

翟氏贵池脊齿兽(新属新种)[1)]*Guichilambda zhaii* gen. et sp. nov.

(图版I, 1–4; 图1–2)

正型标本 残破头骨带分离的左侧颊齿P1–M3及半个残破的犬齿；同一个体的左下颌骨带颊齿p2–m3(m3跟座未保存)、p1的两齿根(齿冠在后来修复时断失)及齿冠残破的犬齿和三个门齿；右侧支带齿冠均已破损的犬齿和全部颊齿及三个门齿的齿根(V12037)。

产地及层位 安徽省贵池县梅埂镇，晚古新世双塔寺组。

特征 同属。

种名由来 种名赠给古脊椎动物学家翟人杰教授。

描述 右侧颧弓前端部分保存，比较圆钝，前部约达M1上方。从保存部分看，颧弓似乎不太向两侧扩展。头骨其余部分可见矢状脊比较低平。

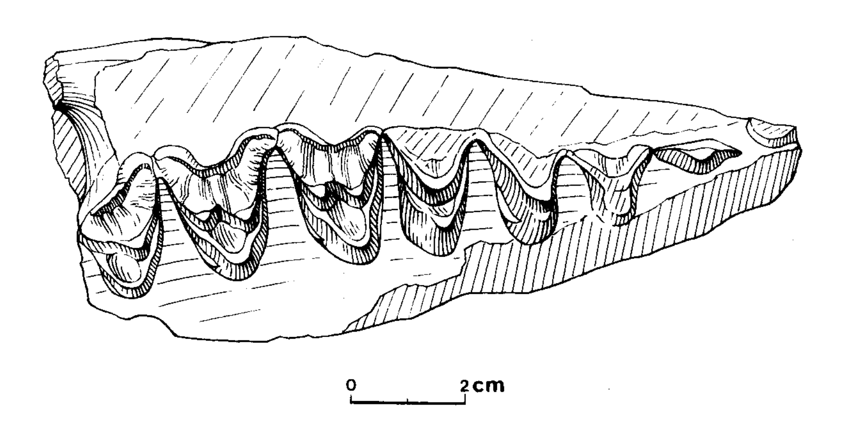


图1 翟氏贵池脊齿兽的右上颊齿(P1–M3)，冠面观

Fig.1 Right upper cheek teeth (P1–M3) of *Guichilambda zhaii* gen. et sp. nov., crown view

上犬齿小，与P1相近，外侧和顶部虽破损，但仍可判断前后向长。它位于P1的前外方，与P1之间约有5毫米的齿隙。

从P1到M3牙齿紧密排列无齿隙。

P1 扁片状，前后向长，外侧平，内侧较凸，齿尖较靠近前端，故由此尖伸向牙齿前缘的脊短而陡，延向后缘的脊比较长而平缓。

从P2到M3牙齿冠面近三角形。

P2 略有破损，冠面轮廓成亚等边三角形。外壁向内凹陷且在中部有小纵肋。

从P3到M3，牙齿前、后齿带轻微发育，但在内侧不相连。牙齿宽度均大于长度。

P3 外壁破损，冠面成亚等腰三角形。外脊靠内，后脊稍比前脊长。原尖前脊不

1) 黄学诗(1995)文中提到的在安徽省贵池县发现的古脊齿兽新种(*Archaeolambda* sp. nov.)，经本文研究它应是一新属新种——翟氏贵池脊齿兽(*Guichilambda zhaii* gen. et sp. nov.)。

明显，原尖后脊较低长，似与原尖间有小的凹槽。

P4　更加横宽，外脊和原尖脊均成 V 形。原尖位于牙齿横中轴前方。原尖前脊短而直，直插入牙齿前壁中部的基部；原尖后脊缓而长，也伸到牙齿后壁中部的基部，但多少有些向后侧凸成弱弧状，并与原尖之间在近原尖处有明显的凹陷。牙齿外壁凹，前壁陡而平，后壁向后凸成弱弧状。牙齿后壁长于前壁。

上臼齿前、后和外侧均有轻微的齿带。

M1　的后尖比前尖稍大，两尖均成三角锥状。由于外壁不陡直，从前、后尖缓向前、后附尖及外壁基部，故使 W 形外脊显著靠内，超过齿宽之半。外凹不深。中附尖弱，略成柱状，在牙齿外壁突出成中附尖肋。在后尖外侧亦有一与中附尖肋相对应的纵肋(垂直齿槽缘)。原尖稍偏于牙齿横中轴之前。原尖也成三角锥状，具 V 形前、后脊。原尖前脊和后脊除分别与前、后尖相接形成封闭的三角凹外，并部分向外下方延伸分别与微弱的前、后齿带相汇。前、后附尖位置相当低，前面臼齿的后附尖几与后面相邻臼齿的前附尖相接而难以分出界限。牙齿前壁比较平直，后壁稍成弧形，后壁长于前壁。

M2　前尖略大于后尖，原尖比在 M1 中靠后。由于前、后壁均成弱弧状，前、后壁基本等长，故牙齿冠面成等腰三角形，比较对称。其他特征同 M1，只个体稍大。

M3　外壁斜向后内方，冠面成斜三角形，外壁和后壁长度接近相等，仅是前壁长的三分之二。后脊和后附尖荡然无存，故后尖成为牙齿的后外角。

表 1　翟氏贵池脊齿兽的上牙齿测量(单位：毫米)

Table 1　Measurements of the upper dentition of *Guichilambda zhaii* gen. et sp. nov.(in mm)

牙齿 tooth	C1	P1	P2*		P3		P4		M1		M2		M3	
长 length	13.3	13.1	13.4		13.4		14.0		15.8		17.8		16.9	
宽 width		4.6	前壁 A.W.	后壁 P.W.	前壁 A.W.	后壁 P.W.	前壁 A.W.	后壁 P.W.	前壁 A.W.	后壁 P.W.	前壁 A.W.	后壁 P.W.	前壁 A.W.	后壁 P.W.
			11.5	12.9	14.9	19.0	18.5	21.4	19.7	23.1	23.8	23.8	23.7	16.8

* 由于齿冠破损，为近似值。A.W.＝anterior wall；P.W.＝posterior wall

表 2　翟氏贵池脊齿兽的上齿列测量(单位：毫米)

Table 2　Measurements of the upper tooth row of *Guichilambda zhaii* gen. et sp. nov.(in mm)

C1－M3	P1－M3	P1－P4	M1－M3
108.2	97.4	52.5	47.6

下颌骨比较平直细长，水平支在 m3 之后底缘略有收缩。p1，m2 和 m3 跟座之下颌骨水平支(左侧支)深度：唇侧分别为 28.8，32.9 和 30.7 毫米；舌侧分别为 29.1，34.8 和 33.0 毫米。下颌骨在下犬齿之下向后直至下臼齿前具有明显的前外凸缘。由于凸缘比较靠

下，故在凸缘和齿槽缘之间颌骨体外侧形成纵向凹槽。右下颌支在m3之后断失，左下颌支虽也残缺，但保存的较长，可看出上升支与水平支夹角较大。整个水平支和角突情况相似于全棱齿兽。咬肌窝不深，咬肌脊前缘达m3跟座之下。下颌联合后缘位于p2之下。

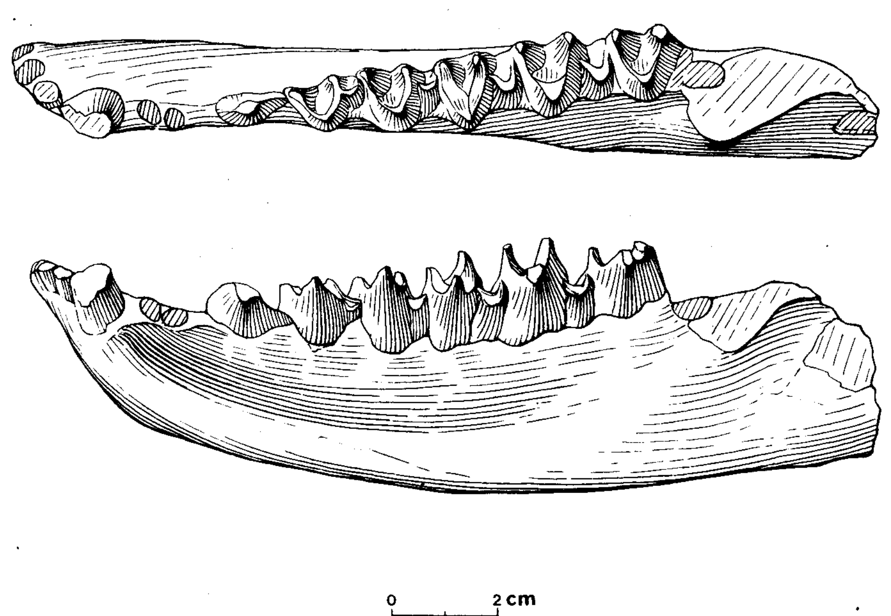


图2 翟氏贵池脊齿兽的左下颌骨和牙齿 上，冠面观；下，唇面观

Fig.2 Left lower jaw with dentation of *Guichilambda zhaii* gen. et sp. nov. upper, crown view; lower, labial view

右侧下颌骨上保存三个下门齿齿根及齿冠均已残破的下犬齿和全部下颊齿。左侧保存齿冠破损的三个下门齿和下犬齿及较完好的下颊齿(m3跟座未保存，p1原来保存并进行过描述，由于本文拖了10多年，新近发现只剩两齿根)。

下门齿位于下犬齿的前内方，均较小，其中i2稍大。下犬齿较大，从齿冠断面看，前后径稍长，比下前臼齿圆。

下颊齿从前到后逐渐增大，齿带不发育。

p1和p2均成扁片状，横向侧扁。p1双齿根，冠面上主尖略靠前，因此从主尖伸向前缘的脊陡峻，伸向后缘的脊长而低。外壁圆隆，内壁也较凸且具小纵肋。p2大小接近、形态相似于p1。p3的三角座成V形，夹角约为60°，下前脊、下后脊及内侧缘三者基本等长，故三角座成等边三角形。三角座上的三个尖比连接它们的脊高。下原尖最高大，下后尖次之，下前尖也相当发育。跟座十分低小，成脊状或非常弱的月牙状，由下后尖后侧基部伸向牙齿后内缘。p4与p3形态相似，但个体较大，三角座较宽，月牙状跟座也较粗壮。

m1和m2形态一致，只是后者大于前者。三角座上的尖、脊与p4的相似，只是更加横宽。下前脊和下后脊组成的V形夹角小，下原尖处比较尖突，整个三角座成以内侧缘为底的亚等腰三角形。下原尖、下前尖和下后尖均很高凸，它们之间的脊——下前

脊和下后脊均在中部下凹。跟座相当低小，亦成 V 形，下斜脊末端与下后尖外侧基部相接，比较靠内，约位于下后脊的内 1 /4 处，相接的位置较低，未及下后脊的磨面。m3 的三角座比较长，由下前脊和下后脊构成的 V 形脊与内侧缘组成近等边三角形。其他特点似前两下臼齿。跟座齿冠断失，由保留的齿根和加大的三角座看，m3 是下齿列中最大颊齿。

表 3　翟氏贵池脊齿兽的下牙齿测量(单位：毫米)

Table 3　Measurements of the lower dentition of *Guichilambda zhaii* gen. et sp. nov. (in mm)

牙齿(tooth)	c1	p1	p2	p3	p4	m1	m2	m3
长(length)	10.4	12.0	12.8	13.4	14.8	15.9	17.6	
宽(width)	9.3	5.0	5.1	9.1	11.2	12.9	14.0	12.6

下颊齿的磨蚀面主要表现在下前脊的前侧、下后脊的后侧(均成倾斜状)及跟座的顶面。

表 4　翟氏贵池脊齿兽的下齿列测量(单位：毫米)

Table 4　Measurements of the lower tooth row of *Guichilambda zhaii* gen. et sp. nov. (in mm)

i1－m2	c1－m2	p1－m2	p1－p4	m1－m2
105.5	98.2	86.0	53.0	32.5

比较和讨论　贵池标本的上颊齿具外凹，P3 和 P4 的原尖脊和外脊成双 V 形，M1 和 M2 的原尖 V 形，外脊 W 形，m1 和 m2 的三角座和跟座均成 V 形脊，表明它是钝脚目的成员。上颊齿 W 形外脊靠内，M3 成斜三角形，外脊成不对称的 V 形，这些都符合亚洲钝脚类的特点。它的矢状脊弱，犬齿特别是上犬齿较小，近乎前臼齿化。上颊齿外谷浅而清楚，W 形外脊靠内超过齿宽之半。下颊齿下前尖不退化，p1 和 p2 侧扁，p3 和 p4 跟座脊状，m1 和 m2 的三角座和跟座均成 V 形，后者特别低小等特点，说明贵池标本应归入全棱齿兽科。而它的上颊齿前、后齿带不太发育，M1 和 M2 不具次尖和次尖架，冠面成三角形；下颌骨上升支比较平缓，与水平支夹角大，前臼齿齿列长于臼齿齿列，这些特点，不同于牧兽亚科，而只能归入全棱齿兽亚科。

全棱齿兽亚科根据本文前一作者(黄学诗，1995)的归类，只有三个属。贵池标本虽有些特点与全棱齿兽属(*Pantolambdodon*)相同，如个体大等，但在一些主要特征上差别较大，如它的上颊齿的前附尖和后附尖位置比前、后尖低得多，P4 的原尖后脊明显中断，M2 是最大的上颊齿；而全棱齿兽上颊齿的前、后附尖的位置相对高，P4 的原尖后脊连续，上臼齿的大小从前向后递减，M1 是最大的上颊齿。贵池标本下臼齿的三角座和跟座的 V 形夹角小，跟座特别低小，无下后附尖；而全棱齿兽三角座和跟座都很开阔，跟座相对较大，具下后附尖。这些不同点表明，贵池标本虽与全棱齿兽大小接近，但不可能是它的成员。贵池标本以其相对小的犬齿、在下犬齿之后无齿隙、下臼齿跟座窄小而区别于具大而圆且与 p1 之间有齿隙的下犬齿及具短宽的下臼齿跟座的南岭兽

(*Nanlingilambda*)。此外，两者之间的个体大小相去甚远。贵池标本与古脊齿兽倒有较多的相似特点，这主要表现在它们的上颊齿的前、后附尖比前、后尖低得多，P4 的原尖后脊不完善，在近原尖处中断，M2 是上齿列中最大颊齿，p4 跟座脊状，m1 和 m2 的三角座和跟座均成 V 形，跟座特别小等。但贵池标本个体大，上下颊齿均横宽，上臼齿中附尖弱等特点，不同于古脊齿兽属中任何已知种。M2 在古脊齿兽中是后壁长于前壁，在全棱齿兽中则相反，后壁短于前壁，而贵池标本在这点上是相似于牧兽(*Pastoralodon*)，两壁长度基本相等。它的上颊齿原尖前、后脊在外侧与前后尖相接，形成封闭的三角凹，M1 和 M2 的后尖外侧具小纵肋，M3 无后脊和后附尖，下颌骨具前外凸缘，下臼齿齿尖高凸等特点，既不同于古脊齿兽，也有别于全棱齿兽亚科和牧兽亚科中其他属种。因此，它作为全棱齿兽科中的一个新属种—— 翟氏贵池脊齿兽，与该科中其他属种的区别是明显的。

扬子古脊齿兽相似种 *Archaeolambda* cf. *A. yangtzeensis* Huang, 1978

(图版 II, 5-6)

材料 一右下颌骨断块附颊齿 p3-m1(V12038)。

产地及层位 安徽省贵池县梅埂镇，晚古新世双塔寺组。

记述 下颌骨只保留了水平支的一部分，粗壮肥厚，下颌联合的后缘约达 p2 的后缘。p3 较细长，三角座冠面破损，跟座斜脊状，似由下原尖后壁伸至后内方。p4 三角座 V 形，下前脊、下后脊和内侧缘长度近等，故使三角座略呈等边三角形。下原尖粗大，下后尖次之，下前尖不退化，与前两尖等高。下前脊和下后脊中部稍凹。跟座略破损，但仍可见成脊状，低小、靠内，连于下后尖基部。m1 的三角座形态、尖、脊等特征基本上与 p4 的同，只是下前尖、下原尖和下后尖更明显突出，下前脊和下后脊中部凹陷更深，下前脊向前凸出成弱弧状。跟座虽也破损，但仍可看出在次尖处成低小的 V 形。下颌骨体在 p2 处唇、舌面深分别为 10.5 和 11 毫米，在 p4 之下唇、舌面深分别为 12 和 13.2 毫米。下颌骨体的厚度在 p3 处及可能相当于 m3 处分别为 7 毫米和 9 毫米。

该标本上的 m1 突出齿槽缘，齿冠基部几与前面的前臼齿冠面等高，曾怀疑它是 dp4。若如此，前面的牙齿分别是 p2 和 p3，联合部后缘则位于 p1 之下，这种靠前的联合在化石中是少见的。这个牙齿之下未见任何新牙或牙胚，而且磨蚀很轻，所以它只能是恒齿，而且只能是 m1。至于高出齿槽缘的原因，笔者认为是病态或其他不正常现象。m1 之后很长一段齿槽中，既无牙齿也无齿根，全部由泥岩充填，说明有可能后两牙齿在动物活着时即已脱落。那么这个 m1，也可能在动物未死之前就已松动，处于要脱未脱之状。

表 5 扬子古脊齿兽相似种的下颊齿(V12038)测量(单位: 毫米)

Table 5 Measurements of the lower cheek teeth of *Archaeolambda* cf. *A. yangtzeensis* (in mm)

牙齿(tooth)	p3	P4	m1	p3-p4	p3-m1
长(length)	6.8	7.5	8.0*	13.2	21.0*
宽(width)		4.0	5.1		

* 由于 m1 跟座破损故为近似值。

贵池的这块标本，下颌联合部后缘位于 p2 后缘之下，下颊齿的下前尖不退化，p4 的三角座成 V 形(p3 的未保存，可能也是 V 形)，p3 和 p4 的跟座成脊状，m1 的三角座和跟座均成 V 形，跟座低小等都是古脊齿兽的性质。它的大小接近邻近的大别古脊齿兽和扬子古脊齿兽，但它的 p4 的跟座斜脊靠内，而不象大别古脊齿兽那样似由下原尖向后内方伸延。它的下颊齿的下前脊和下后脊中部有凹陷，在这些方面相似于扬子古脊齿兽。然而，贵池标本的下颌骨比较粗壮、厚实，它的下颊齿尤其是下臼齿的下前脊向前凸出成弱弧状等特点又不太象扬子古脊齿兽。由于材料比较破碎，故本文只能将它暂定为扬子古脊齿兽相似种。

南方有蹄目　Notoungulata Roth, 1903

北柱兽科　Actostylopidae Schlosser, 1923

沟柱兽属　*Bothriostylops* Zheng et Huang, 1986

进步沟柱兽　*Bothriostylops progressus* (Tang et Yan), 1976

(图版 II, 1–4)

标本　一左下颌骨带颊齿 p2、p4–m3，及 p1 和 p3 的齿根；同一个体的右下颌骨残段带颊齿 m3(V12039)。

产地及层位　安徽省贵池县梅埂镇，晚古新世双塔寺组。

记述　下颌水平支前浅后深，微微向下突起(最突处在 m2 之下)，在 m3 后缘收缩。角突稍向后下方伸延。上升支很陡峻，紧挨 m3，但从外侧看并未遮盖这个牙齿。颏孔位于 p1 和 p2 之间，接近骨体中部，为一小的圆形孔。联合部短，后端达 p2 前部下方。

表 6　进步沟柱兽的下颌骨(V12039)深度测量(单位：毫米)

Table 6　Measurements of depth of the horizontal part of mandibular ramus of *Bothriostylops progressus* (V12039) (in mm)

p2 之下(below p2)		m2 之下(below m2)		m3 之下(below m3)	
唇侧(labial)	舌侧(lingual)	唇侧(labial)	舌侧(lingual)	唇侧(labial)	舌侧(lingual)
5.2	5.5	7.9	8.6	6.9	7.8

p2 之前保存两圆形齿根，估计是 p1 的齿根。p2 齿冠大致成梭形，外壁略显前凸后平，内壁中部有两个纵向小凹陷，前后还各有一个小而不大明显的凹槽，凹陷边缘鼓凸，故从侧面看似有 3—4 个结节状小尖。p3 仅保留两齿根。后面的颊齿除 m3 外，齿冠均有不同程度的破损。p4 三角座虽残缺，但从保留部分看不短于跟座。跟座由一半月形外脊围成一浅盆，下内尖很微弱。下臼齿的跟座长于三角座，但三角座相对仍很发育。下后尖粗大，下前尖和下原尖成脊状，经磨蚀后三角座冠面成不规则的圆形面。外中沟相对靠后，深而开阔，因而沟两侧的外壁较隆凸。下内尖脊伸达半月形外脊，比较横向。牙齿前缘具齿带。三个下臼齿中，m1 最小，m2 和 m3 接近相等，只是 m3 下次

小尖比较膨大，牙齿更为窄长。

比较和讨论 贵池的标本，下颊齿窄长，p2冠面具纵向小尖，下臼齿三角座短于跟座，具外中沟、新月形外脊和下内尖脊，属南方有蹄类无疑。它的三角座相对小，脊形化程度强，而与南方的类群如 *Notostylops* 和 Henricosbornia 等齿尖仍可在齿脊上辨认得出的情况不同。它在许多特征上与北方类群尤其是我国华南发现的某些属种相近。

表7 进步沟柱兽的下颊齿(V12039)测量(单位：毫米)

Table 7 Measurements of the lower cheek teeth of *Bothriostylops progressus* (V12039)(in mm)

牙齿(tooth)	p2	p4	m1	m2	m3	p2－m3	p2－p4	p3－m3	m1－m3
长(length)	3.1	3.4	3.9	4.6*	4.9	25.8	9.8	20.5*	14.5
宽(width)	1.3	1.5	1.7	2.1	1.8				

* 为近似值。

北半球发现的南方有蹄目现统归为北柱兽科，虽然赛菲里等人(Cifelli *et al.*, 1989)已将它提升为目，但实际上仍是一个科，大约包括7属9个种。贵池标本与北柱兽(*Actostylops*)和古柱兽(*Paleostylops*)差别较显著。除了个体比北柱兽和古柱兽的大种(*Paleostylops macrodon*)还大外，它的外中沟比较靠后，外壁较鼓凸，三角座相对不太退化。而后两者外中沟特别靠前，跟座相当长，外壁相对平。北柱兽和古柱兽虽然有人(Rose, 1981等)考虑是一个属，我们认为尽管两者之间有许多共同点，但北柱兽的m2和m3大小相对接近，而古柱兽无论是m2还是M2都相当扩大，m3小得多，与m1相近，这是个显而易见的特点。倒是赛菲里等人(Cifelli *et al.*, 1989)将大古柱兽(*Paleostylops macrodon*)从古柱兽中移出另立新属格沙头柱兽(*Gashatostylops*)没有必要，因为大古柱兽和小古柱兽(*Paleostylops iturus*)同以m2和M2扩大为其主要特征，至于扩大程度上的差异作为种级差别就足够了。郑家坚(1979)将这两属和他所建新属新种围尖异柱兽(*Allostylops periconotus*)一起归入他的新亚科北柱兽亚科(Actostylopinae)。该亚科的特点是：M1和M2成方形或次方形，齿冠外壁扁平，外脊平直，两横脊在齿冠内侧不连接或以浅沟分开；下臼齿三角座前翼很退化，跟座更延长，脊形下内尖很发育。而另一亚科——亚洲柱兽亚科(Asiostylopinae)的M1和M2成三角形或次三角形，齿冠外壁隆凸，外脊不平直，M3具后脊；下臼齿三角座缩短，但前翼不退化，下内尖轻微脊形，略向齿冠外侧延伸，与跟座外半月形脊无明显的相连。贵池的标本虽无上颊齿，但从下臼齿的特点看，尽管下内尖脊比较发育，但仍应归入后一亚科。在这一亚科中，亚洲柱兽属(*Asiostylops*)最原始，它的跟座相对短，三角座虽不算长，但前翼相对不退化，跟座低于三角座，下内尖轻微脊形，与半月形外脊不相连。贵池标本有与它相似的地方，如下三角座前翼不太退化等，然而在许多特点上比亚洲柱兽进步，如跟座基本上与三角座等高，下内尖脊与半月形外脊相连，下颌骨粗壮，个体大等。贵池标本与沟柱兽(*Bothriostylops*)相比，倒有更多相似的地方，如下颊齿外壁隆凸，外中沟深，p4轻微臼齿化，跟座近半月形；下臼齿三角座前后短，下后尖发育，跟座延长，下内尖横脊低但明显，与外半月形脊相接。该属中现有两个已知种——南方沟柱兽(*Bothriostylops*

notios)和进步沟柱兽(*B. progressus*)。前者齿冠低，下内尖脊虽较明显，但斜向延伸于外半月形脊；m3 比 m2 长得多，下颌骨纤细、侧扁，个体小等特点均与贵池标本相去甚远。贵池标本下颊齿齿冠高(p2、m2 和 m3 沿唇面测得齿冠高度分别为 2.2、2.9 和 3.1 毫米)，脊形化程度强(下臼齿下内尖脊成近乎横向的与半月形外脊相接的磨蚀脊)，m2 对 m3 的相对长度大(V12039号标本的 m2 ：m3＝94%；宣城的进步沟柱兽为 95%；而南方沟柱兽和稀少亚洲柱兽分别为 76.5% 和 75%；但小古柱兽这个值比较大，为 108.6%。见郑家坚等，1986)，下颌骨粗壮程度及个体大小等均与已发现的进步沟柱兽基本一致，因此可视为同种，表明它是生活在皖南宣城和贵池一带的一种南方有蹄类。

二、地质时代讨论

安徽贵池梅埂地区发现的哺乳动物化石，计有两目两科三属三个种 —— 翟氏贵池脊齿兽、扬子古脊齿兽相似种和进步沟柱兽。古脊齿兽是亚洲土著类群，化石发现在我国和蒙古，已知地史分布为晚古新世到中始新世，而在我国目前仅知为晚古新世。沟柱兽是中国特有的属，时代为晚古新世。翟氏贵池脊齿兽是新属新种，比较特化，看不出它与全棱齿兽和古脊齿兽之间的进化关系。沟柱兽属中的两个种，进步沟柱兽在齿冠高度、前臼齿臼齿化程度、臼齿脊形及下前尖相对退化的程度、下内尖脊形发育情况、下颌骨粗壮程度及个体大小等方面均明显比产于江西大余池江盆地晚古新世池江组王屋段的南方沟柱兽(*Bothriostylops notios*)进步。因此，含进步沟柱兽的梅埂地区的地层时代要比晚古新世王屋段晚些。

梅埂地区红层的地层剖面，经安徽省地质矿产局区域地质调查队测制，并出版在安徽地质志第三分册上，分 24 层，下部晚古新世痘姆组为 1－9 层，出露厚度约 73 米，其中含丰富的叶肢介化石，经本文后一作者(陈烈祖，1992)研究，计有两属 11 种，它们与潜山盆地痘姆组中所产叶肢介动物群十分相似。剖面中第 10 层至 24 层被定为双塔寺组，厚约 380 米，它与下伏痘姆组为假整合接触。哺乳动物化石发现在第 11 层(翟氏贵池脊齿兽等)和第 15 层(进步沟柱兽)中。从发现的叶肢介化石的研究及地层剖面的上下关系看，含哺乳动物化石的梅埂地层的时代要晚于晚古新世痘姆组。

有趣的是，无独有偶，不仅地层可以对比，而且贵池发现的三种哺乳动物化石，就有两种(扬子古脊齿兽相似种和进步沟柱兽)与相距不远的安徽宣城盆地双塔寺组中所产的有关种类相同或相近(表 8)，这表明两者的时代应相当。

双塔寺组的地质时代长期以来一直有争论，有人认为是晚古新世(汤英俊、阎德发，1976；阎德发、汤英俊，1976；徐钦琦，1976；黄学诗，1978)；也有人考虑它应该是早始新世(郑家坚、邱占祥，1979；郑家坚、黄学诗，1986)；李传夔、丁素因(1983)把双塔寺组的时代放在晚古新世或晚古新世到早始新世；赛菲里等人(Cifelli *et al.*, 1989)将进步沟柱兽的时代作为晚古新世或早始新世。造成上述看法上分歧的主要原因是，发现的化石既少又特殊，一方面比现在可以肯定是晚古新世的种类进步，另一方面又不见典型的早始新世哺乳类。

类似的情况过去也存在在蒙古国中。奈玛盖特盆地(Nemegt Basin)的挪兰布拉克组

表8 贵池和双塔寺哺乳动物群对比表

Table 8 The list of Guichi and Shuangtasi mammalian faunas

属种名称(Species name)	双塔寺(宣城) (Xuancheng)	贵池 (Guichi)
Hsiuannania maguensis	X	
Dissacus magushanensis	X	
Bothriostylops progressus	X	X
Archaeolambda yangtzeensis	X	
Archaeolambda cf. A. yangtzeensis		X
Guichilambda zhaii		X
Wanotherium xuanchengensis	X	

(Naran bulak Formation)的时代是晚古新世还是早始新世，亦有不同的看法。近年来，蒙古古生物学家达司塞维奇(Dashzeveg, 1982, 1988)做了不少工作，他将挪兰布拉克组分为四段，自下而上为：齐格登段(Zhigden Member)，相当于以前文献中的下红色层(Lower Red Beds)，厚27米；挪兰段(Naran Member)，即白色层(White Beds)，厚30米；伯姆巴段(Bumban Member)，即上红色层(Upper Red Beds)，厚20米；顶部为阿盖依特段(Aguet Member)，为灰白色砂质泥岩。达司塞维奇(Dashzeveg, 1988)根据哺乳动物化石，提出在中亚古新世－始新世的界线是在伯姆巴段之下。他认为齐格登段和挪兰段相当于北美的Clarkforkian和欧洲的Sparnacian底部，而伯姆巴段相当于北美的Wasatchian和欧洲的Sparnacian。

北美的Clarkforkian期，罗斯(Rose, 1981)将它分为三个化石带，并且认为古新世－始新世的界线就在Clarkforkian期中，在*Plesiadpis gingerichi*与*P. cookei*带之间。卢卡斯(Lucas, 1989)根据冠齿兽(*Coryphodon*)的研究，提出古新世－始新世界线应放在Wasatchian陆生哺乳动物期中，接近Cray Bull－Lysite界线。金格里奇(Gingerich, 1989)根据WaO动物群的研究，认为北美最早Wasaichian应相当于欧洲的最早Sparnacian。因此整个Clarkforkian陆生哺乳动物期的时代应是晚古新世。最近古奈尔等人(Gunnell *et al.*, 1993)又进一步提议古新世－始新世界线应放在Clarkforkian－Wasatchian界线上，因为界线上下哺乳动物群明显不同，在Wasatchian首次出现偶蹄类(*Diacodexis*)、奇蹄类(*Hyracotherium*)和灵长类(*Cantius*, *Teilhardina*)三个目。而且，古老的南方有蹄目最后绝灭。Clarkforkian期作为最晚古新世。至此，世界范围内的有关古新世和始新世过渡期似乎得以解决。

双塔寺组不整合在晚白垩世宣城组之上，发现过五种哺乳动物化石(表8)。进步沟柱兽比发现在晚古新世池江组王屋段的南方沟柱兽进步得多，郑家坚等(1986)认为南方

沟柱兽代表了奇异亚洲柱兽(*Asiostylops spanios*)和进步沟柱兽之间的一个过渡类型，这样产进步沟柱兽的宣城地层的时代应比晚古新世池江组王屋段晚，所以双塔寺组的时代有可能是早始新世。麻姑宣南兽(*Hsiuannania*)的个体大，齿冠高，珐琅质进入齿槽缘，前臼齿臼齿化程度高，确实比𤝞兽科中古新世成员进步，但宣南兽的其他种并没有超出古新世范畴。宣城皖兽(*Wanotherium xuanchengensis*)标本只保存了部分下臼齿，汤英俊、阎德发(1976)首次记述它时是作为原始奇蹄类，认为在具新月形齿脊和很不发育的下后附尖方面相似小古雷兽(*Lambdotherium*)，但在个体小、齿冠低等方面比这个属原始，因此，认为其时代应属晚古新世晚期。小古雷兽经许多学者研究，是雷兽科的姐妹群，出现的时代很晚，首次出现在北美 Wasatchian 的晚期－Lysitean 分期。因此，李传夔、丁素因(1983)将它作为目未定来处理。由于现有的标本少而破碎，所以它的分类位置还有待更多的材料来解决。双塔寺动物群中的其他两个种——麻姑山中兽(*Dissacus magushanensis*)和扬子古脊齿兽(*Archaeolambda yangtzeensis*)与蒙古挪兰动物群同属，而且与其相近的种——*Dissacus indigenus* 和 *Archaeolambda planicanina* 在进化水平上很接近。

综上所述，虽然双塔寺动物群中有些属种的特征比相关的古新世成员进步，但由于最初认为是原始奇蹄类的宣城皖兽的分类位置还不能最后确定，而且现有的 40% 种(两个)与挪兰动物群中的相近，因此双塔寺动物群的时代可能与挪兰动物群或格沙头动物群大体相当，放在最晚古新世较为合适。同样，贵池动物群的时代也暂定为最晚古新世。

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MAMMALIAN REMAINS FROM THE LATE PALEOCENE OF GUICHI, ANHUI

HUANG Xueshi

(*Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences* Beijing 100044)

CHEN Liezu

(*No. 2 Hydrogeology and Engineering Geology Team of Bureau of Geology and Mineral Resources of Anhui Province* Wuhu, Anhui 241001)

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Summary

In the western part of Tongling Basin, on the southern bank of the Yangtze River,

lies the Meigeng area of Guichi County, Anhui Province. Here is exposed a series of red strata from which local geologists recovered mammalian fossils in the 1980s. Two species of Pantodonta, including a new one, and one species of Notoungulata are currently recognized in the Guichi Fauna. Discussion of the fossil-bearing beds is also presented herein.

1. Paleontology

Pantodonta Cope, 1873

Pantolambdodontidae Granger et Gregory, 1934

Pantolambdodontinae (Granger et Gregory), 1934

***Guichilambda* gen. et sp. nov.**

Type species *Guichilambda zhaii* gen. et sp. nov.

Diagnosis Larger than *Archaeolambda*, but smaller than *Pantolambdodon*. Upper cheek teeth rather wide. Pre-and postprotocrista of upper molars connected with paracone and metacone, respectively, forming a closed basin. Mesostyle weak on upper molars. Anterior and posterior walls nearly equal in length on M2. M3 without metaloph and metastyle. Mandible has thickened anteroexternal border. Cristid obliqua extends rather internally and V-shaped angle of trigonid and talonid relatively small in m1 and m2.

Etymology Named for Guichi county, Anhui Province where the genotype was found.

***Guichilambda zhaii* gen. et sp. nov.**

Type Fragmentary skull with right cheek teeth P1-M3 and root of C1; left lower jaw with p2-m3 (talonid of m3 lost), two roots of p1 and broken crown of c1 and incisors; right lower jaw with all cheek teeth broken, c1 and roots of incisors. All the above pieces are from same individual (V12037).

Locality and age Late Paleocene; Meigeng, Guichi, Anhui.

Diagnosis As for the genus.

Etymology Trivial name for professor Zhai Renjie who assisted us in the study.

Description The anterior part of right zygoma is relatively rounded, extending forward to M1. The zygomatic arch seems to be not expanded laterally, seen from the remaining part. The sagittal crest is low and flat.

C1 is small, about the same as P1, and longer than wide, which can be seen despite tooth damage. It situated in the anteroexternal corner of P1, with a 5 mm-long diastema.

The teeth are arranged closely without diastema from P1 to M3.

P1 is anteroposteriorly long; external wall flat; internal one convex. The main cone lies so anteriorly that the front crest is short and steep, and the postcrest is relatively long, with gentle slope.

The crown is triangular in outline from P2 to M3.

P2 is slightly damaged; the crown a subequilateral triangle. The external wall is somewhat concave inward, with weak vertical ridge on the middle.

The teeth have weak pre-and postcingula disconnected inside and are wider than long from P3 to M3.

The crown of P3 is subisosceles triangular in outline, with broken external wall. The ectoloph is more internally situated, with the metaloph slightly longer than the paraloph. The preprotocrista is weak, and the postprotocrista is relatively low and long.

P4 is wider than P3 and has double V-shaped crests of protocone and ectoloph. The protocone lies in front of transverse middle axis of the tooth. The preprotocrista is short and straight, extending to the base of the middle part of the anterior wall. The postprotocrista, which has a distinct pit with the protocone, is long and slopes gently. It is somewhat convex posteriorly and extends to the base of the middle part of the posterior wall, which is longer than the anterior one.

All upper molars have weak ectocingula, apart from the weak pre- and postcingula.

M1: The metacone is slightly bigger than the paracone. The ectoloph is more internally situated and over half the width of the tooth. The ectoflexus is shallow and the mesostyle is weak. The protocone is situated slightly in front of transverse middle axis of the tooth. The preprotocrista and postprotocrista connect with the paracone and metacone, respectively, forming a closed basin, partly extending to the pre- and postcingula. Both parastyle and metastyle are very low. The anterior wall is flat and straight, shorter than the posterior one, which is convex posteriorly.

M2: In contrast with M1, the paracone is slightly larger than the metacone. The protocone is situated more posteriorly than that in M1. Both anterior and posterior walls are weakly arched, nearly equal in length, so that the crown of the tooth is isosceles triangular, more symmetrically. Other features of M2 are the same as M1, but larger.

M3: The crown is oblique triangular in outline, with the external wall inclined posterointernally. The external wall and the posterior one are nearly equal in length, being two-thirds of the anterior one. Owing to the absence of metaloph and metastyle, the metacone becomes the posteroexternal corner of the tooth.

For the measurements of the upper teeth see Tables 1, 2.

The mandible is relatively straight and slender, slightly contractive under m3. The height of horizontal ramus under the talonids of p1, m2 and m3 is 28.8mm, 32.9mm and 30.7mm labially, and 29.1mm, 34.8mm and 33.0mm lingually, respectively. The horizontal ramus has distinctly thickened anteroexternal border. The posterior margin of the symphysis mandibulae is under p2.

The lower incisors are small, with I2 somewhat larger, situated anterointernally to the lower canine, which is relatively large and rounder than the following lower premolar.

The lower cheek teeth increase in size from front to rear.

p1 is double-rooted, the main cusp on the crown is more anteriorly so that the anterior crest is short and steep, and the posterior one is relatively long and low. The external wall is somewhat rounded and the internal one is a little convex with a small vertical ridge. p2 is similar to p1 both in morphology and in size. The trigonid of p3 is equilateral triangular in outline with V-shaped crest angle of about 60°. The main cusps are higher than the crests connecting them. The paraconid is more developed and the highest cusp is the protoconid on the trigonid. The talonid is low and small, crestlike, extending from the posterior side of the metaconid to the posterointernal margin of the tooth. p4 resembles p3 in tooth structure but bigger in size with even wider trigonid.

m1 and m2 are morphologically alike, but m2 is larger. The cusps and crests on the trigonid resemble those in p4. The angle between the paralophid and metalophid is relatively small. All three cusps, especially the protoconid, are rather high and sharp. The trigonid is isosceles triangular in outline with the internal margin as bottom. The talonid is rather low and small, V-shaped. The cristid obliqua connects with the base of external side of metaconid. The trigonid of m3 is relatively long and nearly equilateral triangular in shape. The other characteristics are similar to those of the first two lower molars. m3 is the biggest of the lower cheek teeth, judging from the broken talonid and the enlarged trigonid.

For the measurements of the lower teeth see Tables 3, 4.

Comparison and discussion The Guichi specimen is assigned to the Pantodonta based on the following characteristics: upper cheek teeth with ectoflexus, P3 and P4 with double V-shape of the protoloph and ectoloph, M1 and M2 with V-shaped protoloph and W-shaped ectoloph, and both trigonid and talonid of m1 and m2 being V-shaped. The W-shaped ectoloph of upper molars is more internally situated. M3 is oblique triangular in outline, with V-shaped ectoloph. All these features are in accordance with those of Asian pantodonts. The Guichi specimen should be placed in Pantolambdodontidae for the following reasons. Its sagittal crest is weak; the canine, especially the upper one, is small and nearly premolar-like; the W-shaped ectoloph of upper molars is situated more internally over half of the tooth width; the paraconid of the lower cheek teeth is not reduced; p3 and p4 have crest-like talonid; the trigonid and talonid of m1 and m2 are both V-shaped, with latter much lower and smaller than the former. Pantolambdodontidae now consists of two subfamilies: Pantolambdodontinae and Pastoralodontinae (see Huang, 1995). The upper cheek teeth of the Guichi specimen have very weak pre- and postcingula, the crown of which is triangular without hypocone and hypocone shelf. The angle between vertical and horizontal parts of the ramus is relatively large and the premolar row is longer than the molar one. The above features indicate that the Guichi specimen should be placed in Pantolambdodontinae.

Pantolambdodontinae contains only three genera according to the senior author of

this study (Huang, 1995). The Guichi specimen differs from *Pantolambdodon* in main characteristics, although they have some common features. In the Guichi specimen, both parastyle and metastyle of the upper cheek teeth are much lower than the paracone and metacone. M2 is the largest of the upper cheek teeth, whereas in *Pantolambdodon*, the position of parastyle and metastyle is relatively high. P4 has continuing postprotocrista, and the upper cheek teeth decrease in size from M1 to M3. In the former, the V-shaped angle of the trigonid and talonid of the lower molars is relatively small. The talonid is rather low and small. The lower molars have no metastylid. While in the latter the lower molars have a broad trigonid, relatively large talonid and metastylid. All above differences indicate that the Guichi specimen does not belong to *Pantolambdodon* although the size is very close. The Guichi specimen differs from *Nanlingilambda* in relatively small canine, without diastema between c1 and p1, small talonid and much bigger size. Guichi specimen, however, resembles that of *Archaeolambda* in many respects, such as much lower parastyle and metastyle, postprotocrista of P4 discontinued near the protocone, M2 being the largest of the upper cheek teeth, the same angles of trigonid and talonid of m1 and m2, and much smaller talonid of the lower molars. But the Guichi specimen has rather wide upper and lower cheek teeth, and its much bigger size distinguishes it from all species of *Archaeolambda*. M2 in *Archaeolambda* has the metaloph longer than the paraloph, while in *Pantolambdodon* it is shorter than the paraloph. In the Guichi specimen, the two lophs are nearly equal in length, which resembles *Pastoralodon*. Its mandible has thickened anteroexternal border, which differs from not only *Archaeolambda*, but also other genera of Pantolambdodontinae and Pastoralodontinae. Thus the Guichi specimen represents a new genus and species —— *Guichilambda zhaii*.

***Archaeolambda* Flerov, 1952**

***Archaeolambda* cf. *A. yangtzeensis* Huang, 1978**

Material A fragmentary lower jaw with p3-m1 (V12038).

Description The mandible is robust. The posterior border of the symphysis mandibulae reaches the posterior margin of p2. p3 is relatively long, with crest-like talonid extending from the posterior wall of the protoconid to the posterointernal corner of the tooth. The talonid of p4 is equilateral triangular in outline. The protoconid is robust. The paraconid is not reduced, and is as high as the protoconid and metaconid. Both the paralophid and metalophid are curved in the middle. The talonid is also crest-like, low and small, and internally situated connecting with the base of the metaconid. The trigonid of m1 is morphologically similar to that of p4. But the paraconid, metaconid, and protoconid are even higher and sharper. The paralophid, which becomes anteriorly convex arc-like, and metalophid are deep curved downward in the middle. The somewhat damaged talonid is V-shaped.

For the measurements of the lower cheek teeth, see Table 5.

From this specimen can be seen the following *Archaeolambda* characters. The posterior border of the symphysis mandibulae lies on the posterior margin of p2, the paraconid is not reduced in the lower cheek teeth, the trigonid of p4 (p3 damaged) is V-shaped, the talonids of p3 and p4 are crest-like and the talonid of m1 is V-shaped, low and small. Its size is nearly the same as that of *A. tabiensis* and *A. yangtzeensis*, the nearest areas' species of *Archaeolambda*. The more internally situated crest-like talonid of p4 is not like that of *A. tabiensis*, which seems to extend from protoconid to the posterointernal corner. The paralophid and metalophid, curved in the middle, resemble those of *A. yangtzeensis* apart from above features. The Guichi specimen, however, has a robust mandible and anteriorly convex arc-like paralophid of the lower molars, which differ from those of *A. yangtzeensis*. At present, it is tentatively treated as *A.* cf. *A. yangtzeensis* because of the fragmentary nature of the specimen.

Notoungulata Roth, 1903

Actostylopidae Schlosser, 1923

***Bothriostylops* Zheng et Huang, 1986**

***Bothriostylops progressus* (Tang et Yan), 1976**

Material Left lower jaw with p2, p4-m3, and roots of p1 and p3; part of right lower jaw of same individual with m3 (V12039).

Locality and age the same as for *Guichilambda zhaii*.

Description The horizontal portion of ramus turns higher from front to rear, slightly convex downward. The vertical part of ramus is more vertical and closely near m3, but does not cover m3 from external view. The mental foramen is a small, round hole, situated in the middle part of the mandible between p1 and p2. The symphysis mandibulae is short, with posterior border under the anterior part of p2.

p1 is double-rooted. p2 is shuttle-shaped with anteriorly convex and posteriorly flat external wall. There seem to be 3 to 4 small tuber-like cusps in the lateral view. p3 has only two roots preserved. The crowns of the other lower cheek teeth are all variously damaged except m3. The trigonid of p4 is not shorter than the talonid seen from the remaining part. The talonid of p4 is lunar, with weak entoconid. The talonid of lower molars is longer than the trigonid, which is still more developed. The metaconid is robust. Both paraconid and protoconid are crest-like. The median external groove is deep, relatively posteriorly situated, and the external wall is convex. The entocristid is more developed, and transversely reaches the external lunar crest. The molars have precingula. m1 is the smallest of the lower molars, and the other two are nearly equal in length.

For the measurements of the lower cheek teeth, see Table 7.

Comparison and discussion In the Guichi specimen, the lower cheek teeth are long;

p2 has small cusps on the crown; the lower molars have median external groove, external lunar crest and entocristid; and the trigonid is shorter than the talonid. All above features indicate that the specimen belongs to Notoungulata. The lower cheek teeth are strongly lophodont, with relatively small trigonid, differing from those of southern forms, such as *Notostylops* and Hericosbornia, in which the cusps can still be distinguished from the crests. It resembles northern forms, especially those discovered from China, in main characters.

The Notoungulate fossils found in northern areas are all in one family, Actostylopidae, although Cifelli *et al.* (1989) promoted it to new order Actostylopida. Now this family includes about 7 genera and 9 species. The Guichi specimen differs from both *Actostylops* and *Paleostylops* in having a relatively posteriorly situated median external groove, more convex external wall and comparatively unreduced trigonid, apart from its large size. Zheng (1979) created a new subfamily, Actostylopinae, for these two genera and his new genus, *Allostylops*. The diagnosis of this subfamily is: M1 and M2 are square or subsquare in outline with flat external wall; the protoloph and metaloph do not connect inside, but are separated by a groove. The trigonid of the lower molars are reduced greatly, and the entocristid is rather developed. The other subfamily, Asiostylopinae named by Zheng (1979), differs from Actostylopinae by M1 and M2 being triangular or subtriangular in shape with convex external wall, M3 having metaloph, and relatively weak entocristid on the lower molars. The features of the Guichi specimen described above demonstrate that the specimen should belong to Asiostylopinae. The Guichi specimen differs from *Asiostylops*, the most primitive genus of the subfamily, in having the trigonid and talonid of nearly equal height, the entocristid linked with external lunar crest, mandible robust and large. It resembles *Bothriostylops* in tooth morphology, which strongly indicates that the specimen is of this genus. *Bothriostylops* includes two species, *B. notios* and *B. progressus*. The former is more brachyodont, the entoconid distinct, m3 much longer than m2, the mandible slender, and the size very small. While in the Guichi specimen the lower cheek teeth are more hypsodont (m2 being 2.9 mm high labially) with stronger entocristid, the length of m2 to m3 is 0.94, mandible robust and size large, all characters which differ distinctly from *B. notios*, but are equal with those of *B. progressus*. It indicates *B. progressus* lived not only in Xuancheng Basin, but also in the Guichi area.

2. About the age of fossil-bearing beds

Three species, *Guichilambda zhaii* gen. et sp. nov., *Archaeolambda cf. A. yangtzeensis*, and *Bothriostylops progressus*, discovered from the Guichi area are recognized in the present paper. *Archaeolambda*, the Asiatic endemic, is found in China and Mongolia, ranging in age from Late Paleocene to Middle Eocene. The fossil record of *Bothriostylops* is Late Paleocene in China. *Bothriostylops progressus* is distinctly more derived than *B. notios*, which is found in the Late Paleocene Wangwu Member, Chijiang Formation, in more hypsodont

lower cheek teeth, more molariform lower premolars, stronger lophodont entocristid, robust mandible and large size. The Wangwu Member, the upper one of the Late Paleocene Chijiang Formation, is Late Paleocene as revealed by many mammalian, spore and pollen fossils (Zheng et Huang, 1986). The *B. progressus*-bearing bed in Guichi should prove to be younger than the Wangwu Member.

The Guichi Section is about 450m thick, and is divided into two parts by local geologists. The lower, named Doumu Formation, contains two genera and eleven species of Conchostraca (Chen, 1992), which resemble the Conchostracan fauna found in the Late Paleocene Doumu Formation, Qianshan Basin. The mammalian fossils were found in the upper part, which lies disconformably on the lower one. It seems that the age of mammal-bearing beds in Guichi is also younger than those of the Doumu Formation.

Of the three mammalian species discussed herein, *Archaeolambda* cf. *A. yangtzeensis* and *Bothriostylops progressus* have been found in the Shuangtasi Formation, Xuanchen Basin, Anhui, which indicates that the age of the beds in the two areas should be the same.

The age, Early Eocene or Late Paleocene, of the Shuangtasi Formation has been long disputed. Because no typical Early Eocene taxa have been found, we tentatively place it in Late Paleocene. But judging from the known mammalian fossils, it is younger than any members of the Late Paleocene Formations in China. Thus, the Shuangtasi Formation and Guichi Fauna might be latest Late Paleocene in age.

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图版说明 (Explanations of plates)

图版 I (Plate I)

翟氏贵池脊兽（新属新种）*Guichilambda zhaii* gen. et sp. nov. (V12037)

1. 右上颌骨附颊齿 p1-m3，冠面观 Right upper jaw with p1-m3, crown view, ×3/4

2-4. 左下颌骨附颊齿 p2-m3 Left lower jaw with p2-m3, ×1/2

2. 舌面观 Lingual view; 3. 冠面观 Crown view; 4. 唇面观 Labial view

图版 II (Plate II)

1-4. 进步沟柱兽 (V12039) *Bothriostylops progressus* (V12039)

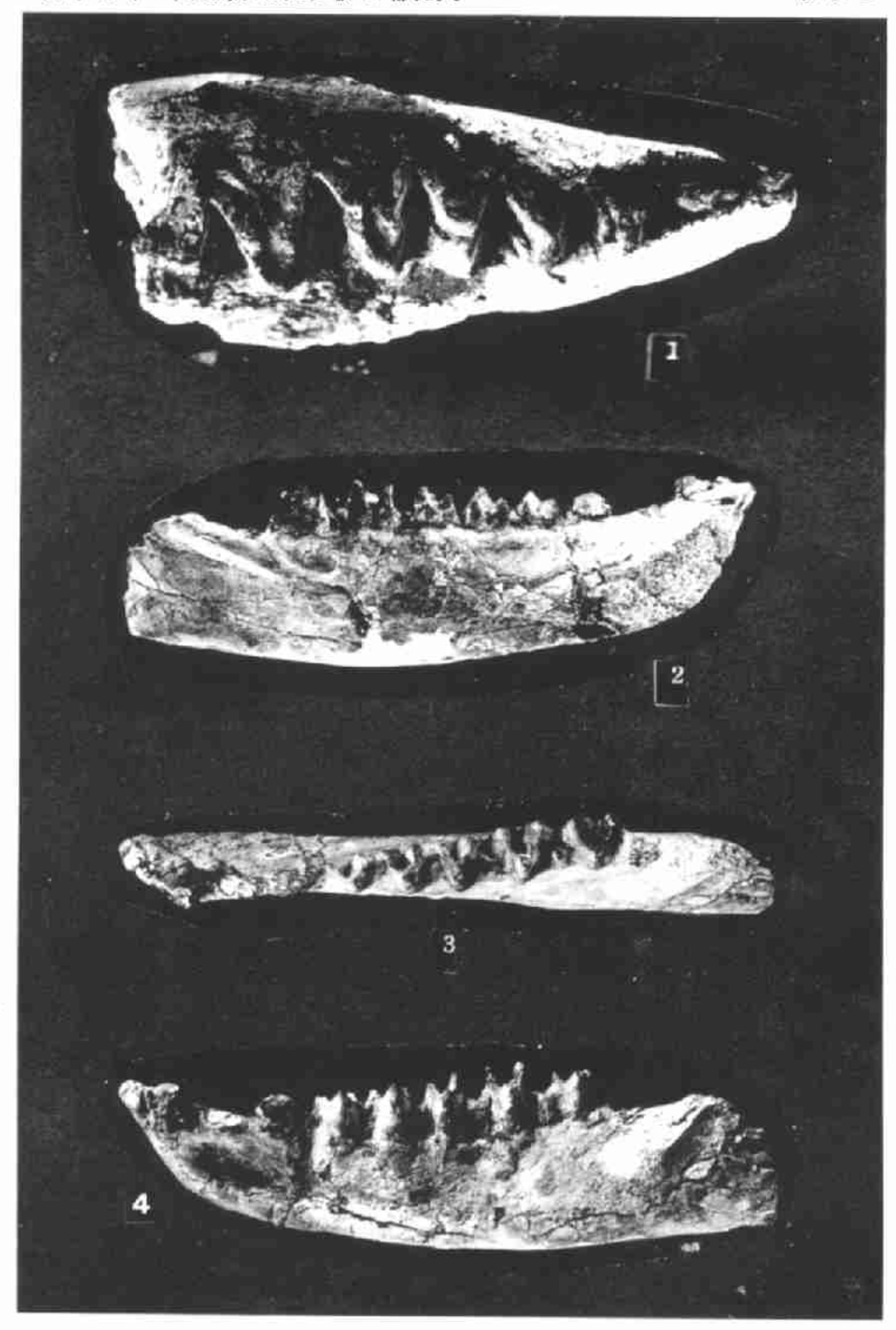
1-2. 左下颌骨附颊齿 p2, p4-m3 Left lower jaw with p2, p4-m3, ×2

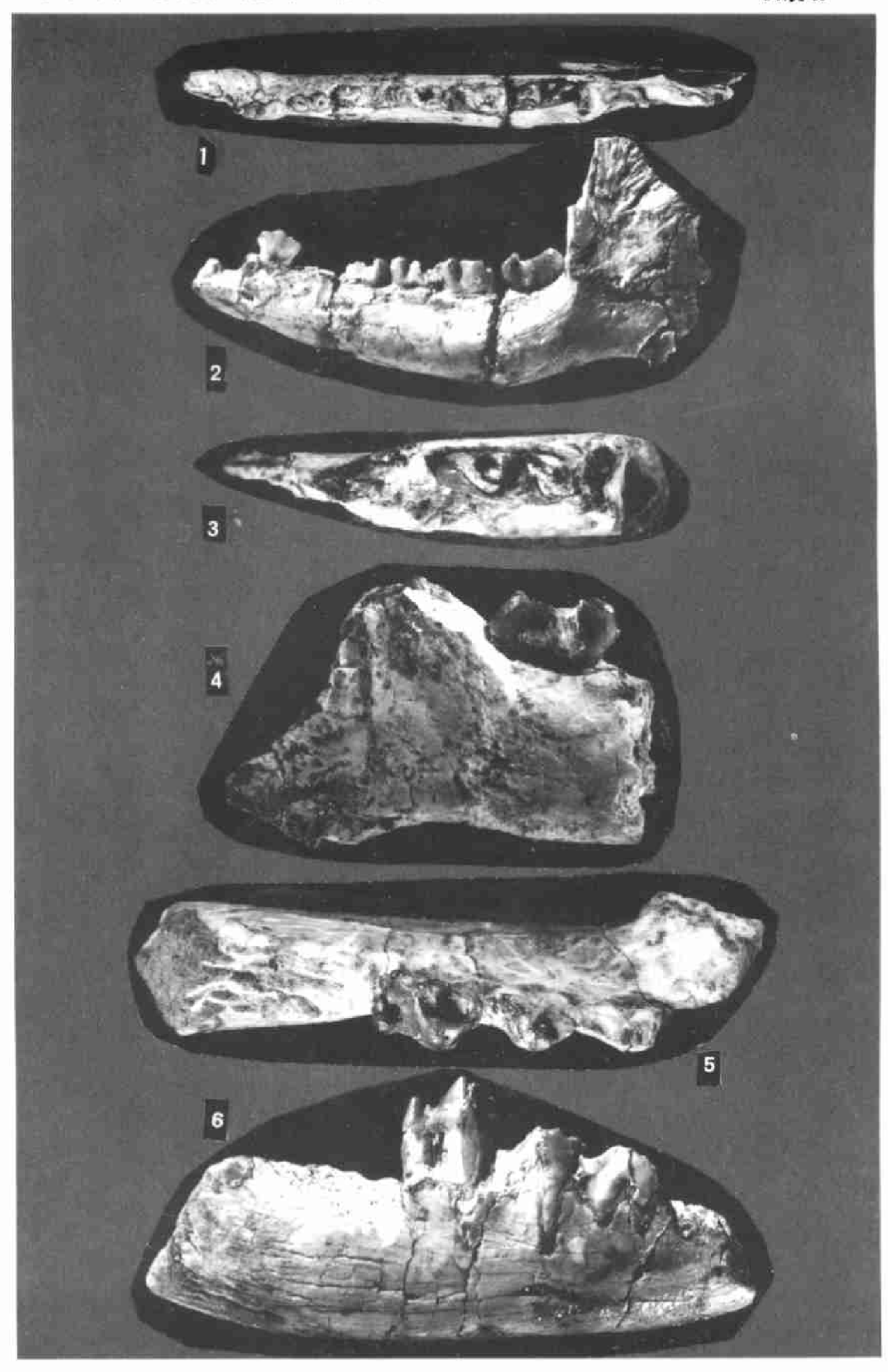
1. 冠面观 Crown view; 2. 唇面观 Labial view

3-4. 右下颌骨附颊齿 m3 Right lower jaw with m3, ×4

3. 冠面观 Crown view; 4. 唇面观 Labial view

5-6. 杨子古脊齿兽相似种的右下颌骨附颊齿 p3-m1 Right lower jaw with p3-m1 (V12038) of *Archaeolambda* cf. *A. yangtzeensis*, ×2 5. 冠面观 Crown view; 6. 唇面观 Labial view


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